OCF 4101 / BFM 4101

MISSION OVERVIEW

ORM

- **Operational Requirements / Limitations**
  - **Crew Rest / Crew Day / Work Week**
  - **R&I**
  - **IP Currency (SOP)**
  - **Warm Up Eligibility**
  - **Previous Flight Incomplete? Determine Graded Items**
  - **On-Wing Required / MCG Notes?**
- **Human Factors**
  - **Life Stressors / External Factors / Personal Problems**
  - **Medical Status (Rest / Nourishment / Hydration)**
- **Hazards and Controls**
  - **Routine**
  - **Weather**
    - **Current Observations and Forecasts**
    - **Crosswinds**
    - **Fuel Considerations**
  - **Mission Specific**

TTO

- **Who will call a TTO?**
- **What situations will the TTO be called?**
  - **Safety**
  - **Confusion / Misunderstanding**
- **IP Responsibilities**
  - **Recognize need for TTO**
  - **Explanation / Instruction as necessary**
  - **Documentation on ATF**
- **When and how will training resume?**

ADMIN / TAC ADMIN REVIEW

- **Weather / NOTAMS / TFR / BASH**
  - **Launch / Enroute / Recovery / Divert**
  - **Environmental Data**
  - ***Cloud tops no higher than 5k' AGL***
  - ***BFM 4101***
    - ***ACM WEATHER MINS APPLY***

- **Questions of the Day**
  - **NATOPS**
  - **EP**
  - **SOP**

- **TIMS Resume Review**

ADMIN

Kneeboard Card Review

- **General**
  - Working Area
  - ATC Clearance
- **Communication Plan**
  - Presets / Manual Freqs / Controlling Agencies
  - Initial Check-in / In-flight Check-Ins / Post-landing
- **Navigation**
  - NAVAIDS / A/A TCN / Waypoint Plan
  - RADALT Procedures
- **Performance Data**
  - RPM (Start / MRT) / Line Airspeed / Takeoff (Rotation / NWLO) / Abort

ADMIN

- **Ground Operations**
  - **Preflight**
    - **No Pylons On The Aircraft**
  - **Start**
  - **Marshal / Taxi**
    - **Properly Functioning Standby Turn Needle**
    - **Adjust Rudder Pedals For Full Throw**
    - **Proper Stick Position For Neutral Stab Position**
- **Take-off / Departure / Route of Flight**
  - **Type take-off / Departure Procedures**
  - **Route of Flight**
- **Recovery**
  - **Fuel Management / Joker / Bingo**
  - **Type Recovery / Route**
    - **OCF 4101 Hot Switch Procedures**
    - **C AUG to ALL**
- **Debrief**

TAC ADMIN

- **G-Warm**
  - **Required for BFM 4101 1v0 Maneuvers**

OCF

- **OCF 4101**
  - **Pre-req: OCF 3101**
  - **Only graded up to the first departure**
- **BFM 4101**
  - **Must be flown no later than two weeks after BFM 3101 and within two weeks of BFM 4301**

- **Discuss Items**
  - **NATOPS Chapter 4, 11 and OCF Emergency Procedures**
  - **Runaway trim**
  - **Engine flameout**
  - **Ejection situations**
  - **BFM 4101 only**
    - **HUD A/A setup**
    - **Training Rules**

T-45 PERFORMANCE AND LIMITATIONS

- **EM Diagram Review**

- **T-45 Limitations**
  - **Engine Limitations**
    - **No abrupt aft stick with engine other than idle**
    - **Idle if <85 KIAS and >15k’**
  - **Lateral Stick Limitations**
    - **<8 units AOA avoid large lateral stick inputs**
    - **<3 units AOA lateral stick inputs prohibited**
  - **Roll Limitations**
    - **With full lateral stick - no more than 180 degree bank angle change (+1.25g to +4g when between 0 and 260 KIAS)**
      - **Adverse Yaw Departure regime**

OCF

- **Departure / Spin procedure**
  - **Neutralize**
  - **Analyze**
  - **Recovery Inputs**
  - **Ejection decision**

  - **Dive Recovery**
    - **If experiencing Post-Stall Gyrations wait till 180 KIAS or greater before initiating recovery (NATOPS).**

  - **If a warning or caution light illuminates, clear the master caution, announce the light over ICS and then continue**

DEPARTURE / SPIN PROCEDURES

- **NEUTRALIZE**
  - **Controls- Neutralize (forcibly center rudder pedals)**
    - **Take out input that caused you to depart, provide smooth airflow over the airframe, prevent rudder blow out**
  - **Speed brakes – Retract**
    - **Provide smooth airflow over the stabs, reduced post-stall gyrations**
  - **Throttle – Idle**
    - **Best compressor stall/flameout margin**

DEPARTURE / SPIN PROCEDURES

- **ANALYZE**
  - **Check altitude, AOA, airspeed, and turn needle**
    - **Altitude is the stopwatch for time remaining**
    - **AOA - Is it pegged at 0 or 28 and above?**
      - **If not, the wing is not currently stalled and you therefore cannot be in a spin**
    - **Airspeed – what is it doing? Increasing, oscillating, what region**
    - **Turn needle – only reliable indication of direction of spin.**
      - **Continue updating instruments over the ICS throughout the recovery (Think CRM)**

DEPARTURE / SPIN PROCEDURES

- **RECOVERY INPUTS (WHEN IN DOUBT MAINTAIN NEUTRAL INPUTS!)**
  - ***If spin confirmed:***
  - **INVERTED (AOA pegged at 0 units)**
    - **Rudder pedal – Full opposite turn needle**
      - **Want to stop the yaw rate**
    - **Lateral stick – Full opposite turn needle**
      - **Aids in stopping the yaw rate**
    - **Longitudinal stick – Neutralize**
  - **Stick movements based on engineering data and test pilots, hit the “I believe” button**

DEPARTURE / SPIN PROCEDURES

- **RECOVERY INPUTS (WHEN IN DOUBT MAINTAIN NEUTRAL INPUTS!)**
  - ***If spin confirmed:***
  - **UPRIGHT (AOA above 28 units)**
    - **Rudder pedal – Full opposite turn needle**
      - **Want to stop the yaw rate**
    - **Lateral stick – Full with turn needle**
      - **Aids in stopping the yaw rate**
    - **Longitudinal stick – Neutralize**
  - **Stick movements based on engineering data and test pilots, Hit the "I believe" button**

DEPARTURE / SPIN PROCEDURES

- **RECOVERY INPUTS**
  - **Only positive recovery indications NATOPS mentions are:**
    - **AOA increasing above 5 units for an inverted spin or AOA decreasing below 20 units for an upright spin**
  - ***If recovery indicated or airspeed increasing through 160 KIAS***
    - **<u>Lateral Stick – Neutralize</u>**
      - **Above 160 kias, the anti-spin input of the stick starts to become pro-spin for the -25 AOA mode**
  - ***When recovery indicated***
    - **<u>Rudder Pedals – Smoothly Center</u>**
      - **Do not center the rudder pedals before positive recovery indications. Doing so may result in rudder blowout and delayed recovery or inability to recover prior to 10k' AGL.**

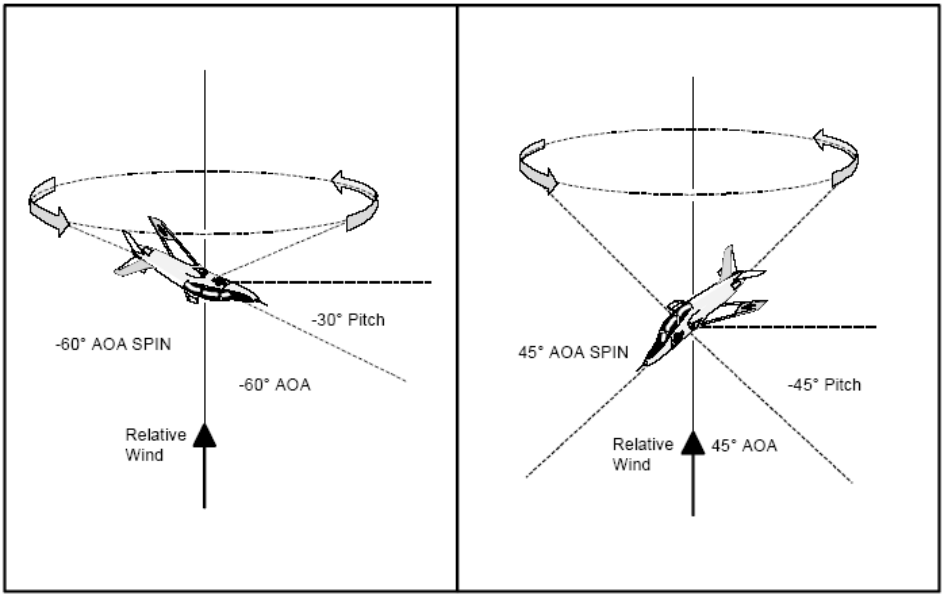
DEPARTURE / SPIN PROCEDURES

- **EJECTION DECISION**
  - ***If out of control passing through 10,000 ft AGL***
    - **<u>EJECT!</u>**
      - **If no signs of recovery by this time, you will not have sufficient altitude to quit spinning and recover from the dive.**

DEPARTURE / SPIN PROCEDURES

- **POST-DEPARTURE DIVE RECOVERY**
  - ***If you are experiencing any post-stall gyrations you must maintain neutral controls until 180 KIAS before initiating the dive recovery***
  - ***1g roll to the nearest horizon***
  - ***Execute a smooth but expeditious pull to maximum usable lift no more than 4 to 5 g's***
  - ***Once a positive rate of climb is established check engine instruments and warning/caution lights before advancing the throttle above idle.***

Spin Modes



INVERTED	AIRSPEED (KIAS)	ALTITUDE LOSS (FT./TURN)	SPIN RATE (SECONDS/TURN)
-60° AOA	50 - 120	1,000	3 - 4
-40° AOA	100 - 160	1,000	3 - 4
-25° AOA	140 - 200	1,700	3 - 4

UPRIGHT	AIRSPEED (KIAS)	ALTITUDE LOSS (FT./TURN)	SPIN RATE (SECONDS/TURN)
30° AOA	INCREASE 10/TURN	1,250	6
45° AOA	100 - 110	1,000	4

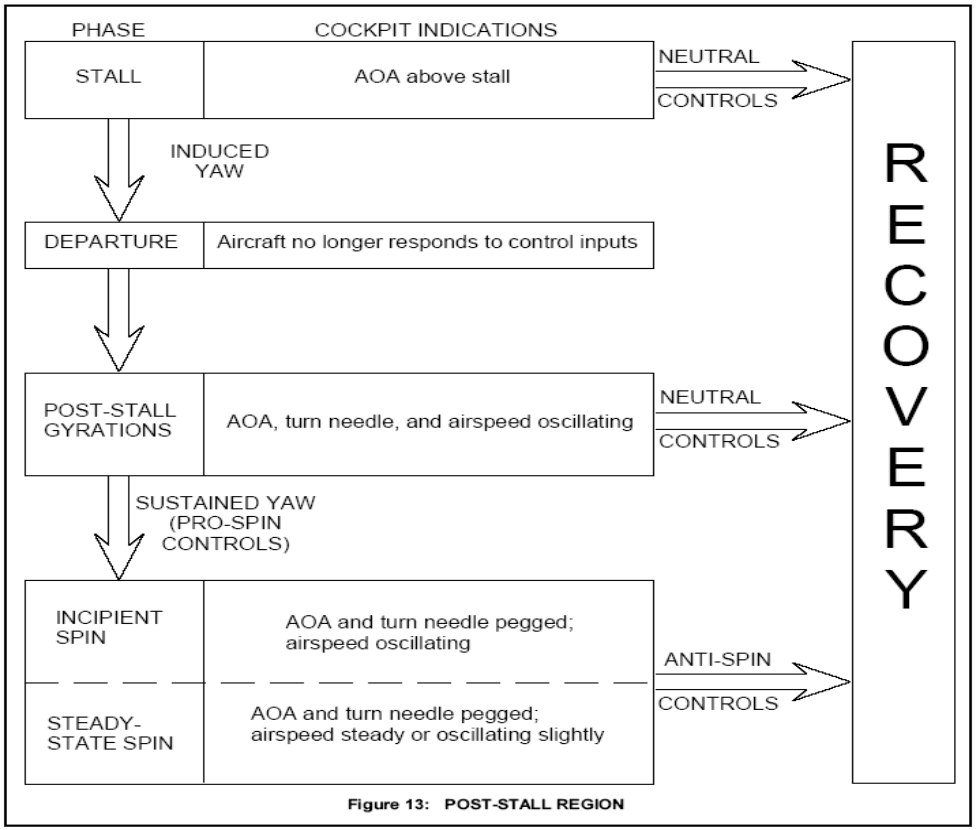


Figure 13: POST-STALL REGION

OCF CHECKLIST

- **Departure checklist**
  1. **Stall/aero checklist – complete**
  2. **Lap belts – tighten**
  3. **Helmet visor – tighten down**
  4. **Rudder pedals – adjust aft for full throw**
  5. **Shoulder harness – as desired**
  6. **Landing gear, flaps / slats – up, speed brakes – retracted**
  7. **BATT switches – on**
  8. **CONTR AUG - SBI**
  9. **Turn needle, airspeed, AOA – check operation**
  10. **ICS – hot mic**
  11. **Throttle friction – set**

- **Stall / aero checklist will be reviewed complete before the start of all subsequent maneuvers**

DEPARTURES

- ***70 / 110 Degrees will be set on the ADI***
- **70 Degree Nose High Departure**
  - **14k' / 300 KIAS**
    - **Pull 15-17 units to 70 deg nose high**
    - **At 150kts, throttle to idle**
    - **Recover when airspeed reaches 50 KIAS or unable to maintain 70 degrees nose high**
      - **Neutralize, Analyze, Recover**
- **110 Degree nose high departure**
  - **14k' / 350 KIAS**
    - **Pull 15–17 units through pure vertical to arrive at 110 deg nose high**
    - **At 150 kts, throttle to idle**
    - **Recover when airspeed reaches 50 KIAS or unable to maintain 70 degrees nose high**
      - **Neutralize, Analyze, Recover**
    - **May see Oil Pres light or Fuel light**

DEPARTURES

- **Adverse Yaw Departure**
  1. **Airspeed 275 KIAS**
  2. **15º Nose Up**
  3. **80 - 90º AOB**
  4. **Throttle Idle**
  5. **At 250 KIAS, pull full aft stick 28-30 units aoa**
  6. **Reverse direction with full opposite aileron and maintain full aft stick**
  7. **Aircraft should depart opposite applied aileron**
  8. **Recover using OCF procedures**
     - **Reference roll limitations**

In this maneuver, you are stalling the aircraft and by introducing a rolling moment, you are changing the relative AOA of each wing. When on the "back side" of the lift curve control inputs have different effects.

The down going wing sees a lower AOA and therefore more lift, but the up going wing sees a higher AOA and less lift. This is opposite of what is normally expected, causing the aircraft to roll opposite of the input.

Neutralizing the controls will immediately recover the aircraft, although you may have built up enough rolling moment to snap roll the aircraft once or twice.

DEPARTURES

- **High AOA / Deep Stall / Rudder-induced Departure**
  - **Altitude above 20,000ft, Throttle to idle**
  - **Slow to 24-26 units**
    - **Will initially be stable, then start getting wing rock. Use the rudder vice lateral stick to fight the rolling of the aircraft. Avoid pitchbuck.**
  - **Pull for 28-30 units**
    - **Use the rudder to keep you upright.**
  - **At anytime throughout the entire high AOA maneuver you hit 90 deg AOB, consider that the departure point and recover.**

BFM 4101 SLIDES ONLY

TRAINING RULES
Review / Discuss Item

ADMIN

1. BRIEF DEPARTURE/SPIN, COMPRESSOR STALL PROCEDURES, AND CURRENCY – All in flight have flown: 1 in 6 and 2 in 14 (<750 hrs), or 1 in 14 and 2 in 30 (>750 hrs)

2. FACE-TO-FACE BRIEF OF ALL MANEUVERS FOR ALL PARTICIPANTS.

3. ACM WILL BE CONDUCTED IN AN AUTHORIZED AREA ONLY FROM 30 MIN AFTER SUNRISE TO 30 MIN PRIOR TO SUNSET.

4. ACM WX MINS:

   a. 5 miles visibility with a defined horizon.
   b. 11K' between broken/overcast layers.
   c. 1 NM horizontally and 2K' vertically from all clouds.
   d. ACM may be conducted above broken/overcast layer provided the highest layer is below 7K' AGL for solo events and 8K'AGL for dual events. The flight lead will then establish the hard deck 5K' above that layer and all A/C will acknowledge the new hard deck.

5. HARD DECK SHALL BE 10,000 FT AGL MIMIMUM.

6. SOFT SHALL BE 5,000 FT ABOVE THE HARD DECK.

   a. No <u>sustained</u> low speed/high AOA maneuvering (less than 120 knots <u>AND</u> more than 24 units) below the soft deck.

7. ALL AIRCRAFT MUST HAVE OPERABLE UHF AND ICS (MULTI-CREW) AND MONITOR GUARD.

8. CONFIGURATION CHANGES OTHER THAN SPEED BRAKES ARE NOT AUTHORIZED.

9. "G" AWARENESS MANEUVER REQUIRED PRIOR TO ACM.

COLLISION AVOIDANCE

10. MAINTAIN A 500' BUBBLE AROUND ALL AIRCRAFT.

11. ALWAYS ASSUME THE OTHER AIRCRAFT DOES NOT SEE YOU.

12. MAINTAIN THE ESTABLISHED TREND ON HEAD TO HEAD PASSES. WHEN NO TREND EXISTS, EACH AIRCRAFT SHALL GIVE WAY TO THE RIGHT FOR A LEFT-TO-LEFT PASS. TRANSMIT YOUR OWN INTENTIONS.

13. LOW AIRCRAFT IN A HORIZONTAL SCISSORS IS RESPONSIBLE FOR SAFE SEPARATION. NOSE HIGH GOES HIGH, NOSE LOW HAS COLLISION AVOIDANCE RESPONSIBILITY. TRANSMIT YOUR OWN INTENTIONS.

COLLISION AVOIDANCE (continued)

14. NEVER INTENTIONALLY MANEUVER TO LOSE SIGHT (NO BLIND LEAD TURNS).

15. IF LOST SIGHT, TRANSMIT "BLIND" AND REMAIN PREDICTABLE. OTHER AIRCRAFT SHALL ACKNOWLEDGE WITH "CONTINUE" OR 'KNOCK-IT-OFF" AS APPROPRIATE, PROVIDING DIRECTIVE COMM AS NECESSARY FOR SAFETY OF FLIGHT. ONCE SIGHT IS REGAINED, TRANSMIT "TALLY."

16. UP-SUN AIRCRAFT IS RESPONSIBLE FOR COLLISION AVOIDANCE. IF DOWN-SUN AIRCRAFT LOSES SIGHT, BREAK OFF THE ATTACK, TURN AWAY FROM PREDICTED COLLISION BEARING AND BROADCAST "BLIND, SUN." UP-SUN AIRCRAFT SHALL ACKNOWLEDGE WITH EITHER "CONTINUE" OR "KNOCK-IT-OFF" CALL.

17. BREAK OFF ALL GUN ATTACKS AT 1,000', NO FORWARD QUARTER GUN ATTACKS (45 deg of target nose). CNATRA WEAPONS ENVELOPES APPLY.

TERRAIN AVOIDANCE

18. IN A DESCENDING FIGHT, THE OFFENSIVE (HIGH) AIRCRAFT SHALL MONITOR THE DEFENSIVE (LOW) AIRCRAFT'S ALTITUDE, ATTITUDE AND AIRSPEED AND BREAK OFF THE ATTACK PRIOR TO PUSHING THE DEFENSIVE AIRCRAFT THROUGH THE HARD DECK.

TERMINATION

19. ANYONE CAN CALL A "KNOCK-IT-OFF." EACH AIRCRAFT SHALL TERMINATE THE ENGAGEMENT, MANEUVER TO SAFETY AND ACKNOWLEDGE WITH THEIR OWN "KNOCK-IT-OFF." WATCH OUT FOR THE MID-AIR POTENTIAL FOLLOWING A "KNOCK-IT-OFF".

20. KNOCK-IT-OFF FOR ANY OF THE FOLLOWING:

   a. Any training rule is violated.
   b. Interloper (unbriefed A/C) enters the engagement area.
   c. Any OCF flight situation develops.
   d. G-LOC experienced or suspected. (Aircrew shall RTB).
   e. Radio failure/loss of ICS. An aircraft rocking wings is an automatic "knock-It-off."
   f. Bingo fuel state is reached
   g. Dangerous situation/loss of situational awareness/inadvertent IMC/possible overstress.
   h. Training objectives have been reached.
   i. Engaged aircraft crosses the border of the authorized training area.

1v0 Maneuvering

- **Miscellaneous 1v0 Maneuvers (Demo / Do)**
  - **Must adhere to intent of Training Rules (e.g. Hard / Soft Deck)**
  - ***C AUG TO ALL***

1)Flats Entry

- **15k' / 200 KIAS**
- **Focus on initial entry, resetting nose, turns at 23-24 AOA**

2)Break Turn

- **16k' / 350 KIAS**
- **Break for 90-180 degrees. Capture airspeed / altitude. Break again then maneuver nose low.**
- **Look over your shoulder while maneuvering!**
  - **Technique to push against canopy and look "above" the headbox aft. (e.g. left break turn - put left hand on canopy and push to look over the starboard side of the headbox).**
  - **A right break turn may require switching hands on the stick.**

1v0 Maneuvering

- **Miscellaneous 1v0 Maneuvers (Demo / Do)**
  - **3) Minimum Vertical vs. Tactical Vertical Airspeed**
    - **Perform Immelman at 300 and 350 KIAS**
      - **300 KIAS 1% rule of airspeed to G. Past pure nose high light buffet pull to horizon**
      - **350 KIAS hard pull around. Can execute vertical extension and/or lift vector re-orientation.**
    - **180-200 KIAS commit to a horizon. Roll upright when canopy bow reaches horizon (technique).**
  - **4) Roller**
    - **16k' / 200 KIAS**
    - **Focus on getting nose up to 35 to 45 degrees nose high and then the pirouette mechanics.**
  - **5) Acceleration checks**
    - **1g straight/level (300 to 350 KIAS)**
    - **Unloaded acceleration (0.0 to 0.2g 300 to 350 KIAS)**

RTB

- **Precautionary approach**
- **Landing(s)**

CONTINGENCIES

- Aircraft Fallout
- Clear Engine Procedure
- Aborted Take-off
- Runway Departure / Loss of Directional Control
- System Failures / Emergency Procedures / CRM
- NORDO / LCLS (Altitude) / HEFOE / ICS Failure
- Inadvertent IMC / Lost Sight
- Midair
- Bird Strike
- Disorientation
- Hypoxia
- Ejection (High / Low / Ground)
- SAR / On Scene Commander
- Diverts / BINGO Profile

QUESTIONS